

IN THE CLAIMS

Please substitute the following listing of claims for the previous listing of claims.

1. (Currently amended) A substrate processing apparatus comprising:
a process chamber comprising a substrate support, gas inlet, gas energizer, gas exhaust, and a wall having a radiation permeable wall portion, the radiation permeable wall portion comprising a plurality of recesses sized to reduce the deposition of process residues therein; and
a process monitoring system to monitor radiation passing through at least one of the recesses in the radiation permeable wall portion.
2. (Currently amended) An apparatus according to claim 1 further comprising a wherein the process monitoring system is capable of monitoring a process that may be conducted in the process chamber to process a substrate, by monitoring radiation that is reflected from the substrate and that is passed through a at least one of the recesses ~~recess~~ in the radiation permeable wall portion.
3. (Previously presented) An apparatus according to claim 1 wherein the recesses originate at an internal surface of the radiation permeable wall portion.
4. (Previously presented) An apparatus according to claim 3 wherein the recesses terminate in the radiation permeable wall portion.
5. (Previously presented) An apparatus according to claim 1 wherein the recesses comprise an aspect ratio of at least about 0.25:1.
6. (Previously presented) An apparatus according to claim 5 wherein the recesses comprise an aspect ratio of at least about 3:1.

7. (Previously presented) An apparatus according to claim 5 wherein the recesses comprise an aspect ratio of less than about 12:1.

8. (Previously presented) An apparatus according to claim 1 wherein the recesses comprise an opening size of from about 0.1 to about 50 mm.

9. (Previously presented) An apparatus according to claim 1 wherein the recesses comprise a depth of from about 0.5 to about 500 mm.

10. (Previously presented) An apparatus according to claim 1 wherein the recesses comprise a diameter of less than about 10 times a thickness of a plasma sheath that may be formed in the chamber.

11. (Canceled)

12. (Previously presented) An apparatus according to claim 1 wherein the radiation permeable wall portion comprises one or more of Al_2O_3 , SiO_2 , AlN , BN , Si , SiC , Si_3N_4 , TiO_2 , ZrO_2 and mixtures and compounds thereof.

13. (Previously presented) An apparatus according to claim 12 wherein the radiation permeable wall portion comprises quartz.

14. (Canceled)

15. (Previously presented) An apparatus according to claim 1 wherein the wall further comprises a masking portion.

16. (Withdrawn) An apparatus according to claim 1 further comprising an electromagnetic field source adapted to maintain an electromagnetic field about the recess.

17. (Withdrawn) An apparatus according to claim 16 wherein the electromagnetic field source comprises an electrical or magnetic field source.

18. (Currently amended) A substrate processing apparatus comprising:
a chamber having a support, gas inlet, gas energizer, and exhaust,
and a ceiling having an integral radiation permeable wall portion, the radiation permeable wall portion having a recess sized to reduce the deposition of process residues therein; and
a process monitoring system to monitor radiation passing through the recess in the radiation permeable wall portion,

whereby a substrate held on the support may be processed by process gas introduced by the gas inlet, energized by the gas energizer, and exhausted by the exhaust.

19. (Canceled)

20. (Previously presented) An apparatus according to claim 18 wherein the recess controls an access of energized gas species to the radiation permeable wall portion.

21. (Canceled)

22. (Previously presented) An apparatus according to claim 18 wherein the recesses comprise an aspect ratio of at least about 0.25:1.

23. (Currently amended) An apparatus according to claim 18 further comprising a wherein the process monitoring system is capable of monitoring radiation that is reflected from the substrate and that is passed to monitor radiation passing through the recess in the radiation permeable wall portion.

24. (Withdrawn) A method of processing a substrate in a chamber, the method comprising:

- (a) placing the substrate in the chamber;
- (b) providing an energized gas in the chamber to process the substrate; and
- (c) providing a recess in a wall of the chamber, the recess being adapted to reduce the formation of process residue therein.

25. (Withdrawn) A method according to claim 24 comprising passing radiation through a radiation permeable wall portion adjacent the recess.

26. (Withdrawn) A method according to claim 24 further comprising passing the radiation through material comprising one or more of Al_2O_3 , SiO_2 , AlN , BN , Si , SiC , Si_3N_4 , TiO_2 , ZrO_2 and mixtures and compounds thereof.

27. (Withdrawn) A method according to claim 24 comprising directing radiation onto the substrate, measuring radiation reflected from the substrate, or both.

28. (Withdrawn) A method according to claim 24 further comprising applying an electrical or magnetic field about the recess.

29. (Withdrawn) A method according to claim 24 further comprising providing a wall having a masking portion with the recess therein.

30. (Currently amended) A substrate processing apparatus comprising:
a process chamber comprising
a substrate support,
a gas inlet,
a gas energizer,
a gas exhaust, and
a wall comprising a radiation permeable wall portion, the
radiation permeable wall portion having a plurality of recesses originating at an internal
surface of the radiation permeable wall portion, the recesses having an aspect ratio
sized to reduce the deposition of process residues therein; and
a process monitoring system to monitor radiation passing
through at least one of the recesses in the radiation permeable wall portion.

31. (Currently amended) An apparatus according to claim 30 further
comprising ~~a wherein~~ the process monitoring system is capable of monitoring a process
that may be conducted in the chamber to process a substrate, by monitoring radiation
that is reflected from the substrate and that is passed through at least one of the
recesses in the radiation permeable wall portion.

32. (Previously presented) An apparatus according to claim 30 wherein
the recesses comprise an aspect ratio of at least about 0.25:1.

33. (Previously presented) An apparatus according to claim 30 wherein
the recesses comprise a passageway inclined at an angle of less than about 90
degrees.

34. (Previously presented) An apparatus according to claim 30 wherein
the radiation permeable wall portion comprises one or more of Al_2O_3 , SiO_2 , AlN , BN , Si ,
 SiC , Si_3N_4 , TiO_2 , ZrO_2 and mixtures and compounds thereof.

35. (Canceled)

36. (Previously presented) An apparatus according to claim 30 wherein the recesses are arranged to pass therethrough radiation originating from the plasma or radiation reflected from different portions of the substrate.

37. (Withdrawn) A substrate processing apparatus comprising:
a process chamber comprising a substrate support, gas inlet, gas energizer, gas exhaust, and a wall having a recess that is sized to reduce the deposition of process residues therein;

a magnetic field source adapted to maintain a magnetic field near the portion of the wall having the recess; and

a process monitoring system capable of monitoring a process that may be conducted on a substrate in the process chamber through the recess in the wall.

38. (Withdrawn) An apparatus according to claim 37 wherein the magnetic field source comprises one or more permanent magnets or electromagnets.

39. (Withdrawn) An apparatus according to claim 37 wherein the recess extends to a radiation permeable portion in the wall.

40. (Withdrawn) An apparatus according to claim 37 wherein the process monitoring system evaluates an attribute of radiation emanating from the chamber and passing through the recess and the radiation permeable portion.

41. (Withdrawn) An apparatus according to claim 37 wherein the recess comprises an aspect ratio of at least about 0.25:1.

42. (Withdrawn) An apparatus according to claim 37 wherein the wall is made from a material that is at least partially permeable to electromagnetic radiation, electrically conducting, or both.

43. (Withdrawn) An apparatus according to claim 37 further comprising an electrical field source adapted to maintain an electrical field near the portion of the wall having the recess.

44. (Withdrawn) A substrate processing apparatus comprising:
a process chamber comprising a substrate support, gas inlet, gas energizer, gas exhaust, and a wall having a recess that is sized to reduce the deposition of process residues therein;
an electrical field source adapted to maintain an electrical field about the recess; and
a process monitoring system capable of monitoring a process that may be conducted on in the process chamber through the recess in the wall.

45. (Withdrawn) An apparatus according to claim 44 wherein the electrical field source comprises an electrode abutting the wall.

46. (Withdrawn) An apparatus according to claim 44 wherein the recess extends to a radiation permeable portion in the wall.

47. (Withdrawn) An apparatus according to claim 46 wherein the process monitoring system evaluates an attribute of radiation emanating from the chamber and passing through the recess and the radiation permeable portion.

48. (Withdrawn) An apparatus according to claim 44 wherein the recess comprises an aspect ratio of at least about 0.25:1.

49. (Withdrawn) An apparatus according to claim 44 wherein the wall is made from a material that is at least partially permeable to electromagnetic radiation, electrically conducting, or both.

50 (Withdrawn) An apparatus according to claim 44 further comprising a magnetic field source adapted to maintain a magnetic field near the portion of the wall having the recess.

51. (Currently amended) A substrate processing apparatus comprising:
a process chamber comprising a substrate support, a gas inlet, a gas energizer, a gas exhaust, and a sidewall about the support, the sidewall having an integral radiation permeable wall portion, the radiation permeable wall portion comprising at least one recess sized to reduce the deposition of process residues therein; and
a process monitoring system to monitor radiation passing through at least one recess in the radiation permeable wall portion.

52. (Original) An apparatus according to claim 51 further comprising a second recess in the sidewall.

53. (Original) An apparatus according to claim 51 wherein the recess is inclined relative to the sidewall.

54. (Original) An apparatus according to claim 53 wherein the recess is inclined from about 50 degrees to about 60 degrees relative to the sidewall.

55. (Currently amended) An apparatus according to claim 51 further comprising a wherein the process monitoring system is capable of monitoring a process that may be conducted in the process chamber to process a substrate, by monitoring radiation that is reflected from the substrate and that is passed through the at least one recess in the radiation permeable wall portion.

56. (Previously presented) An apparatus according to claim 51 wherein the recess originates at an internal surface of the radiation permeable wall portion.

57. (Previously presented) An apparatus according to claim 56 wherein the recess terminates in the radiation permeable wall portion of the sidewall.

58. (Original) An apparatus according to claim 51 wherein the recess comprises an aspect ratio of at least about 0.25:1.

59. (Original) An apparatus according to claim 51 wherein the recess comprises an opening size of from about 0.1 to about 50 mm.

60. (Original) An apparatus according to claim 51 wherein the recess comprises a depth of from about 0.5 to about 500 mm.

61. (Previously presented) An apparatus according to claim 51 wherein the radiation permeable wall portion comprises a plurality of recesses.

62. (Original) An apparatus according to claim 51 wherein the sidewall comprises a plurality of recesses on opposing sides of the support.

63. (Previously presented) An apparatus according to claim 51 wherein the sidewall further comprises a masking portion.

64. (Original) An apparatus according to claim 51 further comprising an electromagnetic field source adapted to maintain an electromagnetic field about the recess.

65. (Withdrawn) A method of processing a substrate in a chamber, the method comprising:

- (a) placing the substrate in the chamber
- (b) providing an energized gas in the chamber to process the substrate;
- (c) providing a recess in a sidewall of the chamber; and
- (d) passing radiation through the recess.

66. (Withdrawn) A method according to claim 65 comprising passing the radiation through a radiation permeable wall portion adjacent the recess.

67. (Withdrawn) A method according to claim 65 wherein (d) comprises directing radiation onto the substrate, measuring radiation reflected from the substrate, or both.

68. (Withdrawn) A method according to claim 65 wherein (d) comprises passing radiation through a first recess and onto the substrate and detecting reflected radiation passing through a second recess.

69. (Withdrawn) A method according to claim 65 wherein the recess is adapted to reduce the formation of process residue therein.